TCH Evidence-Based Outcomes Center
Clinical Algorithm for the Acute Management of Congenital Diaphragmatic Hernia Patients Prior to ECMO
Inpatient Algorithm

NICU Admission Labs†
CBC with diff and platelets, serum lactate, and type/screen
24 Hour of Life Labs
BNP, Chem 7, Bilirubin panel, Newborn Screen, Chromosomal Microarray

Criteria for Repair:#
Mean BP normal for gestational age
Pre-ductal sats 85-95% on FiO2 < 50%
Lactate < 3
Urine output > 2 ml/kg/hr
Less than 10% gradient in pre/post-ductal sats

Criteria for MIS:#
Mean BP normal for gestational age without inotropes
Pre-ductal sats 85-95% on FiO2 < 40% without iNO
Lactate < 3
Urine output > 2 ml/kg/hr
Less than 5% gradient in pre/post-ductal sats

Admit to NICU 4
Initiate conventional mechanical ventilation
Adjust tidal volume to achieve physiologic monitoring parameter goals
Place 10 french repogle to LIS if not done
Insert UVC and appropriately placed UAC if not already done
Consult ECMO surgeon, Neo ECMO clinician and ECLS specialist
Monitor pre and postductal saturations
Administer erythromycin and Vitamin K

Obtain a PICC and/or PAL if umbilical lines not appropriately placed
Draw ABG, lactate and NICU admission labs† once umbilical lines placed
Obtain CXR and KUB
Obtain HUS in in first 24 hours of life
If at risk for sepsis, obtain a blood culture and administer ampicillin and gentamicin
Obtain an echo within 24 to 48 hours after birth

CDH Ventilator Settings*
Conventional ventilator AC/VG
PEEP: 5 – 6 cmH_2O
TV: 4 – 5 cc/kg
MAX PIP: 28
Back-up rate: 40 breaths/minute
IT: 0.3 seconds
FiO2 – adjust for target pre-ductal saturations of ≥80%

Criteria for iNO – any item below¥
OI > 25
Preductal sats < 90% on 100% FiO2
Pre/post ductal gradient > 10%

Optimal Physiologic Monitoring Parameters^
Preductal sats ≥85%
pH >7.20
pCO2: 50 to 70
pO2: 40 to 90

Resp distress **OR** physiologic parameters out of range^?

No → Continue to monitor
Yes → Adjust TV and PEEP per CDH Ventilation guidelines

Hypotension?
Yes → Titrate dopamine to achieve optimal blood pressure
Once dopamine reaches 10 mcg/kg/min, start hydrocortisone
No → Continue to monitor

Hypotension continued?
No → Continue to monitor
Yes → Continue to titrate dopamine.
Once dopamine reaches 20 mcg/kg/min, consider starting epinephrine
If hypotension unresolved with epinephrine, obtain an echo and treat accordingly

Continued Resp distress **OR** physiologic parameters out of range^?
No → Hypotension?
Yes → Criteria to start iNO met?¥
Yes → Start iNO 20 ppm
ABG within one hour to evaluate response to iNO
No → Continued Resp distress **OR** physiologic parameters out of range^?
Yes → Initiate HFOV per CDH ventilation guidelines≠
Consult ECMO Clinician if not already done
ABG in 30 minutes
CXR in one hour
No → Continued Resp distress **OR** physiologic parameters out of range^?
Yes → Initiate ECMO‡ ; administer one dose of cefazolin within one hour of cannulation
CXR STAT
ABG STAT
→ Patient placed on ECMO

Does patient meet criteria for repair#?
Yes → Surgeon to determine eligibility for MIS or open repair#
No → Continuously assess for readiness for repair
When criteria for surgery met proceed to next step
→ Surgeon to determine eligibility for MIS or open repair#
→ Repair complete

Legend
MIS – minimally invasive surgery
PICC – peripherally inserted central catheter
AC/VG – assist control volume guarantee
OI – oxygenation index

CDH HFOV settings:≠
MAP 13 (or 2 above that on conventional vent)
MAX MAP: 17
IT: 0.3
Hz: 10
Delta P: Sufficient to produce perceptible "jiggle" to upper abdominal area

Additional ECMO Criteria‡
OI > 40
PO2 persistently <40
Lactate rising above 3
(Parameters should not be used in isolation)